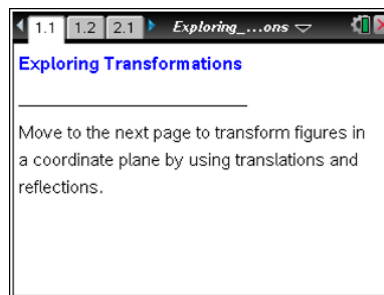




Open the TI-Nspire document *Exploring_Transformations.tns*.

In this activity, you will translate and reflect shapes in the coordinate plane. You will begin with a triangle with vertices **A(1, 2)**, **B(4, 7)**, and **C(7, 3)**.



Move to page 1.2.

1. Drag point *H* left and right to translate the triangle horizontally. Drag point *V* up and down to translate the triangle vertically.
 - a. Identify the coordinates of points *B'* and *C'* if the triangle is translated 4 units to the left. How would you determine the coordinates mathematically?
 - b. Identify the coordinates of points *B'* and *C'* if the triangle is translated 4 units to the left and 5 units down. How would you determine the coordinates mathematically?
2. How must you translate $\triangle ABC$ for point *B'* to have coordinates (3, 9)?
3. Herschel moved point *A* to produce a new triangle. He then translated $\triangle ABC$ left 2 and down 5.
 - a. Where would Herschel have placed point *A* for the coordinates of point *A'* to be (-4, -3)?
 - b. Explain how you can determine the coordinates of point *A* mathematically.

Move to page 2.1.

4. Reflect the triangle over the *x*-axis.
 - a. Identify the coordinates of points *B'* and *C'* after the triangle is reflected over the *x*-axis.
 - b. How would you determine the coordinates mathematically?
5. Reset the figure by moving the point back to the *N* position. Reflect the triangle over the *y*-axis.
 - a. Identify the coordinates of points *B'* and *C'* after the triangle is reflected over the *y*-axis.
 - b. How would you determine the coordinates mathematically?



6. Describe how a reflection is different from a translation.
7. Reset the figure by moving the point back to the N position.
 - a. Predict the coordinates of points A' , B' , and C' if the triangle is reflected over both the x -axis and the y -axis.
 - b. Reflect the figure over both the x -axis and the y -axis and test your predictions.
 - c. How would you determine the coordinates of A' , B' , and C' mathematically?

Move to page 3.1.

8. Drag the points labeled V and H so that the **L** lies completely in Quadrant IV. What translations are needed so that the image of **L** lies completely in Quadrant IV?

Move to page 4.1.

9. Move the **L** to Quadrant IV by using the open circles in the upper left corner of the screen.
 - a. What transformations were necessary for the image of **L** to appear in Quadrant IV?
 - b. Does the order in which the **L** is reflected matter? Why or why not?
10. In the transformations on pages 3.1 and 4.1, why do you think that the letter **L** was used to illustrate the concept of transformations rather than the letter **H**?
 - a. Justify your answer mathematically or with a sketch.
 - b. What other letters would be good choices to illustrate transformations using reflections?
 - c. What letters are *not* good choices to illustrate transformations using reflections? Explain your answer.